MEMORANDUM

DATE: June 21, 2002

SUBJECT: Request for a Removal Action at the Calcasieu Estuary Site, Bayou Verdine Area of Concern, Lake Charles, Calcasieu Parish, Louisiana

FROM: John Meyer, Remedial Project Manager
Project Management Section (6SF-LP)

TO: Myron O. Knudson, P.E., Director
Superfund Division (6SF)

THRU: Wren Stenger, Chief
Louisiana/New Mexico Branch (6SF-L)

I. PURPOSE

This memorandum requests approval for a Removal Action pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended, 42 U.S.C. §§9601 et seq., at the Bayou Verdine Area of Concern in the Calcasieu Estuary (Site) in Lake Charles, Louisiana. The proposed action involves the removal of principal threat wastes at the Site and proper disposal off-site.

This action meets the criteria for initiating a removal action under the National Contingency Plan (NCP), 40 CFR §300.415. In accordance with 40 CFR § 300.415(a)(2), an effort has been made to determine whether or not the responsible party can and will perform the Removal Action. The Potentially Responsible Parties ("PRPs"), Conoco, Inc. ("Conoco") and Sasol North America, Inc. ("Sasol") have informally indicated to the U.S. Environmental Protection Agency (EPA) that they will perform the Removal Action in compliance with an Administrative Order on Consent. This action is expected to require less than twelve months to implement and cost more than $2 million.

II. SITE CONDITIONS AND BACKGROUND

CERCLIS # :LAD985195346
Category of Removal: Time Critical/Enforcement
Site ID # KH
Latitude: 30° 14' 30" N
Longitude: 93° 17' 00" W

A. Site Description

1. Removal Site Evaluation

The "Site" or "Bayou Verdine Area of Concern" is defined as the discrete portion of the Bayou Verdine channel extending upstream 2.8 miles from its mouth and its tributaries and each of their associated surface water, sediments, soil, biota, adjoining shoreline and banks, riparian habitats and wetlands. The 2.8 mile Bayou Verdine channel was subdivided into four spatially distinct reaches extending from 0.5 miles upstream of the Conoco facility to Coon Island Loop.

Conoco and Sasol have undertaken an investigation and evaluation of Bayou Verdine in cooperation with the EPA Region 6 investigation of the Calcasieu Estuary. The Conoco/Sasol investigations are reported in the following documents:

1) Bayou Verdine Investigation: Volume I, Nature and Extent Investigation, Lake Charles, LA (NEI Report). ENTRIX Inc., October 12, 1999.

2) Bayou Verdine Investigation, Volume II: Screening Level Ecological Risk Assessment, Lake Charles, LA. ENTRIX Inc., November 3, 1999.

3) Bayou Verdine Investigation, Volume III, Baseline Ecological Risk Assessment, Lake Charles, LA (BERA). ENTRIX Inc., March 30, 2001.

4) Bayou Verdine Investigation, Volume IV, Baseline Human Health Risk Assessment, Lake Charles, LA (HHRA). ENTRIX Inc., April 12, 2001.

Although the investigations have evaluated the full nature and extent of contamination in Bayou Verdine, the focus of this removal action is to address the localized contamination in Bayou Verdine at the confluence with the West Ditch Area.

West Ditch Area

Elevated 1,2-dichloroethane (EDC) concentrations were detected in the Bayou Verdine sediments in a relatively localized portion of the Site near the confluence of West Ditch and Bayou Verdine. The NEI sampling indicated sediment samples from this area contained up to 1.9% EDC (dry weight), whereas concentrations detected in other sections of the bayou ranged from 11 to 16 ∶g/kg (dry weight).

Based on the risks identified in the investigations, an Engineering Evaluation/Cost Analysis (EE/CA) for the Bayou Verdine Area of Concern of the Calcasieu Estuary was started. The EE/CA was implented by Conoco and Sasol in accordance with an Administrative Order on Consent signed February 14, 2002 .

During the investigations in preparation for the EE/CA, elevated 1,2-dichlorethane (EDC) concentrations were further delineated in the sediments in the area near the confluence of the West Ditch and Bayou Verdine. At all of these locations the highest sediment EDC concentrations were detected in the deepest samples. EDC was detected in clay samples at concentrations ranging from 0.064 to 22,700 mg/kg (wet weight basis). The EDC concentrations were substantially lower at 1-foot into the clay than at one-half foot into the clay.

The highest EDC concentrations in the sediment and clay were located in the area from approximately 30 feet west of the bridge over Old Trousdale Road downstream to near the confluence of the West Ditch with Bayou Verdine.

2. Physical Location

Bayou Verdine is a wetland bayou located within the Calcasieu Estuary southwest of the city of Westlake and slightly northwest of the city of Lake Charles in Calcasieu Parish. Bayou Verdine's headwaters originate in a predominately agricultural area immediately north and northwest of the Conoco and Sasol facilities and flow in a generally south-southeast direction, subject to tidal influences, through an industrialized area before entering Calcasieu River at Coon Island Loop (Attachment 2).

3. Site Characteristics

The Site adjoins agricultural, residential, commercial and industrial properties. The primary land use along Reaches 1, 2, and 3 of Bayou Verdine is industrial. Commercial land use is

present farther west from the north end of Reach 1 and the south end of Reach 2, along Interstate 10 and Highway 90. Former residential and some current residential areas are present north of the area of industrial land use on the north side of Reach 3. Rural and some residential land use is present farther north of the bayou in Reach 4. The watershed upstream of Reach 4 includes agricultural and residential land uses.

Bayou Verdine is the recipient of discharges pursuant to National Pollutant Discharge Elimination System (NPDES) permits. These discharges have included outfalls belonging to Vista, Conoco, and PPG Industries, Inc. ("PPG"). In addition, three drainage ditches, including the Vista West Ditch, the Faubacher Ditch, and the Kansas City Southern Railroad West Ditch discharge into Bayou Verdine.

Due to its location within the watershed, this system likely receives non-point source input from agricultural lands encompassing its northern reaches, and from Faubacher ditch. Faubacher ditch serves as an urban drainage system for the city of Westlake and flows through the current Conoco property prior to its discharge directly into Bayou Verdine. Accompanying these potential non-point sources are the past and current industrial point source discharges into Bayou Verdine.

During the 1950's, the southernmost 3,500 feet of Bayou Verdine were rerouted by Olin Corporation when it built a pond over the original bayou. The former route of the Bayou south of Interstate 10 was to the east of its present course, but the confluence with Coon Island Loop was near its present mouth. The only reported dredging of Bayou Verdine in recent history was by PPG in 1992 at the North Barge Slip. Bayou Verdine is reportedly about 20 feet deep in this area.

4. Releases or Threatened Release Into the Environment of a Hazardous Substance, Pollutant or Contaminant

Elevated 1,2-dichloroethane (EDC) concentrations were detected in the Bayou Verdine sediments in a relatively localized portion of the Site near the confluence of West Ditch and Bayou Verdine. The NEI sampling indicated sediment samples from this area contained up to 1.9% EDC (dry weight), whereas concentrations detected in other sections of the bayou ranged from 11 to 16 ∶g/kg (dry weight). EDC is designated as a CERCLA hazardous substance as defined at CERCLA Section 101(14), 42 U.S.C. §9601(14), and further defined at 40 CFR §302.4.

5. NPL Status

The Site is not included on the National Priorities List (NPL) and is not currently proposed for consideration.

6. Maps, Pictures and Other Graphic Representations

Attachment 1 Enforcement Addendum
Attachment 2 Site Location Map
Attachment 3 Summary of Comparative Analysis

B. Other Actions to Date

1. Previous Actions

Sasol North America Inc. (Sasol) modified its water discharge permit to remove its primary outfall from Bayou Verdine to the Calcasieu River. With elimination of this component of flow to the bayou, there was consideration that during severe low water periods, the sediments in the West Ditch Area could become exposed. Therefore, a temporary low sill structure (TLSS) was installed across Bayou Verdine in May 2002, to control the water elevation and reduce the potential for volatile emissions from the sediments until the West Ditch Area removal action is complete. The TLSS was designed to maintain a minimum water depth of one foot over the sediments.

The structure consists of two parallel inflatable, reinforced polyvinylchloride (PVC) tubes bonded together and encased in a housing of similar material, with skirts extending several feet outward from the base of the housing. The TLSS structure was inflated onshore, positioned over the prepared area, and pulled across the bayou. After the TLSS was anchored down, the structure was filled with a water sand slurry mixture.

Since the installation of the TLSS, Sasol has discontinued discharge into Bayou Verdine. The water elevations in the bayou have been checked during low and high tide conditions. During low tide conditions there is a minimum pool elevation that is being maintained by the TLSS and during high tide and periods of high water the TLSS is operating as an overflow wier.

2. Current Actions

There are no current on-site activities taking place at the Site.

C. State and Local Authorities' Roles

1. State and Local Actions to Date

No State or local actions have occurred to date within the area of interest for this action.

2. Potential for Continued State/Local Response

The Louisiana Department of Environmental Quality (LDEQ) will continue to provide support for activities conducted at the Site. At this time, EPA has not requested that LDEQ fund a portion of the response action because the PRPs are expected to perform this Removal Action under CERCLA Section106.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

A. Threats to Public Health or Welfare

The conditions at the facility may present a threat and an imminent and substantial endangerment to public health or welfare or the environment based upon the factors set forth in Section 300.415(b)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan, as amended, 40 CFR Part 300, ("NCP"). Any or all of these factors may be present at a site yet any one of these factors may determine the appropriateness of a removal action.

1. Actual or Potential Contamination of Drinking Water Supplies or Sensitive Ecosystems 40 CFR §300.415(b)(2)(ii)

The EDC in the sediments is currently being investigated by Conoco as a source of ground water contamination as part of its facility-wide ground water investigation. A wetlands area is hydraulically connected downstream in Bayou Verdine.

2. High Levels of Hazardous Substances or Pollutants or Contaminants In Soils Largely At or Near the Surface, That May Migrate, 40 CFR §300.415(b)(2)(iv)

The HHRA (ENTRIX, 2001b) provided a conservative evaluation of the potential risk

to workers from accidental exposure to the sediments by falls into the West Ditch Area. Based on this evaluation, the estimated potential noncarcinogenic risks are in the acceptable range of 0.003 to 0.2 for the average (AVG) and reasonable maximum exposure (RME) scenarios, respectively. The estimated potential carcinogenic risk ranges from 6×10^{-8} to 2×10^{-6} for the AVG and RME exposure scenarios, respectively. A majority of the hypothetical risk is attributed to dermal contact with EDC in the sediments. The assumptions and exposure factors used to develop these scenarios are presented in the HHRA. A sediment removal action concentration goal was calculated for this EE/CA using the RME exposure factors and a conservative target carcinogenic risk level of 1×10^{-6}. The calculated sediment removal action concentration for EDC in the West Ditch Area is 289 mg/kg.

EDC was characterized in the sediments of Bayou Verdine at levels above the solubility limit. The EDC has settled into a depression in the clay bottom of the bayou and is entrained in the overlaying sediments. Changes in stream dynamics could easily mobilize the EDC into other parts of the bayou.

3. Weather Conditions That May Cause Hazardous Substances or Pollutants or Contaminants to Migrate or Be Released; NCP §300.415(b)(2)(v)

Historically, the Site's locality has inclement weather, such as brief periods of heavy rainfall. A surge of flood waters could scour the bottom of the bayou causing the contamination to spread.

4. The Availability of Other Appropriate Federal or State Response Mechanisms to Respond to the Release, 40 CFR §300.415(b)(2)(vii)

There are no other mechanisms available to respond to this release in a timely manner so as to effectively address the imminent and substantial endangerment to human health posed by the hazardous substances located on the Site. State and local officials do not have the resources available to address the current situation. If other mechanisms become available during the conduct of this response action, the EPA will evaluate that mechanism, as appropriate.

B. Threats to the Environment

The Baseline Ecological Risk Assessment (BERA) addresses potential exposure to ecological receptors. The EDC concentrations observed in the sediment resulted in hazard quotients (HQs) in the range of 1 to 5 for the heron, kingfisher and muskrat. These risk estimates were driven

solely by incidental sediment ingestion and are based on exposure to the maximum detected sediment concentration. HQ's were all below unity using the average sediment concentration of 1,219 mg/kg (wet weight), which is well above the removal action concentration of 289 mg/kg for protection of human health. Therefore the 289 mg/kg removal action concentration will also be protective of the bird and mammal receptors.

Based on this evaluation, the response action objective for the West Ditch Area is to address sediments above 289 mg/kg.

IV. ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances, contaminants, or pollutants from this Site may present an imminent and substantial endangerment to the public health, welfare, or the environment. This endangerment should be abated or mitigated in order to protect public health, welfare, and the environment by implementing the response action selected in this Action Memorandum.

V. PROPOSED ACTIONS AND ESTIMATED COSTS

The following summarizes the West Ditch Area removal action scope that provides the basis for the action:

- The estimated horizontal extent of sediments within Bayou Verdine that are impacted at concentrations above the 289 mg/kg removal action concentration is from approximately 30 feet upstream of the bridge at Old Trousdale Road to approximately 160 feet downstream of the bridge. Within the West Ditch, the estimated extent above 289 mg/kg is about 75 feet upstream of its confluence with Bayou Verdine. This covers an area of approximately 11,700 square feet.

- Sediment thickness in the West Ditch Area ranges from about 1.5 to 3.5 feet. The sediment is described as loose, black silt, high in natural organic content. The underlying clay is described as light brown to gray and very stiff. The sediments and the underlying clay have been impacted by EDC. Generally, the highest concentrations occur in the upper 6 inches of the clay.

- To provide added protectiveness, the limits of the removal action described herein will extend beyond the limits of the 289 mg/kg removal action concentration. As shown on Figure 5-1, the removal action limits will extend from approximately 120 feet upstream of the bridge at Old Trousdale Road to approximately 250 feet downstream of the bridge and will include approximately 140 feet of West Ditch. This encompasses an area of approximately 23,400 square feet.

- Alternatives that involve dredging or excavating the sediments will include the sediments and the upper six inches of clay. Assuming a removal depth of three feet throughout the West Ditch Area, the estimated volume of sediments to be addressed by dredging/excavation alternatives is 2,600 in-place cubic yards.

- Toxicity Characteristic Leaching Procedure (TCLP) testing, as per 40 CFR 261.24, of the sediment samples from this area indicates that some of the material to be removed from that West Ditch Area would likely be classified as a D028 characteristic hazardous waste. The samples for TCLP testing (Table 2-7) were generally collected from the sediments with higher total EDC concentrations. It is likely that some of the excavated material will not fail the TCLP tests and can be handled as nonhazardous waste.

A. Proposed Actions

Considering the relative performance of the alternatives, the recommended removal action alternative is Alternative WD-2 (Dredging and Offsite Incineration/Disposal) for the West Ditch Area. This alternative provides the best balance of the evaluation criteria when compared to the other alternatives as shown in Attachment 3.

1. Proposed Action Description

Alternative WD-2 - Removal and Offsite Incineration/Disposal

Sediments will be removed from the West Ditch Area and transported offsite for incineration/disposal. A barrier system and cover will then be placed over the underlying clay.

Removal - The removal action will include sediments within the West Ditch Area that are above the risk-based removal action concentration, and 0.5 feet of the underlying clay. Two potential removal options, removal with a vacuum truck and removal with a hybrid mechanical/hydraulic dredge will be considered. Temporary diversion structures will be installed to divert the bayou during the removal activities.

Off-Site Incineration/Disposal - Some of the material removed from the West Ditch Area will likely be subject to land disposal restrictions. Accordingly, this material will be transported offsite to a permitted commercial hazardous waste incinerator. Excavated materials that are not subject to land disposal restrictions will be disposed of at an offsite disposal facility permitted to accept the waste.

Barrier System and Cover - A competent barrier system will be constructed on top of the underlying clay. Conceptually, the barrier system will consist of the following three layers from the bottom up:

- A barrier layer directly on top of the clay to impede the vertical movement of water and sediments;
- A protective layer to protect the barrier layer; and
- Sand/silt cover material to provide a substrate with a texture similar to natural conditions (minimum of one-foot thick).

2. Contribution to Remedial Performance

Because the proposed Removal Action is a source control removal action, it is consistent with long-term remediation strategies.

3. Description of Alternative Technologies

Several other alternative technologies were evaluated for this removal action. A summary of the comparison is presented in Attachment 3. The alternative technologies that were evaluated are summarized below.

Alternative WD-1 - Natural Recovery

Alternative WD-1 is natural recovery of the West Ditch Area. Site risks would be reduced by natural sedimentation and degradation of the EDC and other organics over time. Alternative WD-1 would include hydrodynamic and sedimentation studies as well as sediment sampling to evaluate the effectiveness of natural recovery. Baseline monitoring and development of a long-term monitoring plan would be conducted during the first year. Subsequent monitoring would include:

- Annual sediment sampling for site constituents to determine whether concentrations are decreasing with natural recovery.
- Annual surveying of sediment pins at specified locations to quantify the amount of deposition (if any) that is occurring. It is assumed that the monitoring program would be conducted for a 10-year period.

Alternative WD-3 - Removal and Onsite Thermal Desorption

Alternative WD-3 would include removal of the sediments within the West Ditch Area, onsite thermal desorption of the material, placement of a barrier system, and placement of cover material. The boundary of the removal area would be the horizontal limits shown on Figure 5-1. Within these limits, the sediments and 0.5 foot of the underlying clay would be removed.

The sediment removal activities would be conducted in a manner to minimize the release of volatile constituents, and also to minimize the amount of water generated, which potentially would contain EDC and require treatment.

Alternative WD-4 - Containment/Capping

Alternative WD-4 would consist of covering the West Ditch Area sediments that are above the removal action concentration with a Gabion Mattress Containment System.

Gabions are flexible wire mesh baskets that are typically filled with earth or stone and used as support structures. The gabion mattress system that would be used consists of rectangular units that are divided into cells typically 6 feet wide with diaphragms spaced at 3-foot intervals. A continuous panel of mesh forms the base, the sides, and the end walls of the unit to form an open-top multi-cell container. The system would be filled with soil or stone to provide a permanent barrier over the contaminated sediments.

4. Applicable or Relevant and Appropriate Requirements

This removal action will be conducted to eliminate the threat or potential threat of a hazardous substance, pollutant or contaminant pursuant to CERCLA, 42 U.S.C. § 9601 et seq., and in a manner consistent with the National Contingency Plan, 40 CFR Part 300, as required at 33 U.S.C. §1321(c)(2) and 42 U.S.C. §9605.

As per 40 CFR §300.415(J), fund-financed removal actions under CERCLA Section 104 and removal actions pursuant to CERCLA Section 106 shall, to the extent practicable considering the exigencies of the situation, attain the applicable or relevant and appropriate requirements under

Federal environmental law, including, but not limited to, the Safe Drinking Water Act (SWDA), 42 U.S.C. §300f et seq., the Clean Air Act (CAA), 42 U.S.C. §7401 et seq., the Clean Water Act (CWA), 33 U.S.C. §1251 et seq., the Resource Conservation and Recovery Act, 42 U.S.C. §6901 et seq., or any promulgated standard, applicable or relevant and appropriate requirements, criteria, or limitation under a State environmental or facility siting law that is more stringent than any federal standard, requirement, criteria, or limitation contained in a program approved, authorized or delegated by the Administrator and identified to the President by the State.

5. Project Schedule

The removal project will require approximately six to nine months to complete.

B. Estimated Costs

Alternative	Capital Cost ($)	Present Worth O&M Cost ($)	Total Present Worth Cost ($)
Alternative WD-2	7,100,000	0	7,100,000

The Potentially Responsible Parties ("PRPs") have expressed their willingness to implement the necessary removal action and will therefore fund this removal action.

VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

If the proposed time-critical removal action for contaminant source control is not taken at the Site, the Site's toxic hazardous substances will migrate into the surface water column and ground water, thereby exposing humans and/or animals who are using the aquifer. Furthermore, the migration of the Site's contaminants would continue to contaminate larger volumes of sediment, thereby increasing the cost of any possible future remediation project.

VII. OUTSTANDING POLICY ISSUES

There are no outstanding policy issues associated with the Site or the proposed clean up.

VIII. ENFORCEMENT

See Attachment 1 for the Enforcement Addendum.

IX. RECOMMENDATION

This decision document represents the selected time critical removal action for the Bayou Verdine Area of Concern in the Calcasieu Estuary in Lake Charles, Louisiana, developed in accordance with CERCLA, as amended, and not inconsistent with the NCP, 40 CFR Part 300. This decision is based on the administrative record for the Site.

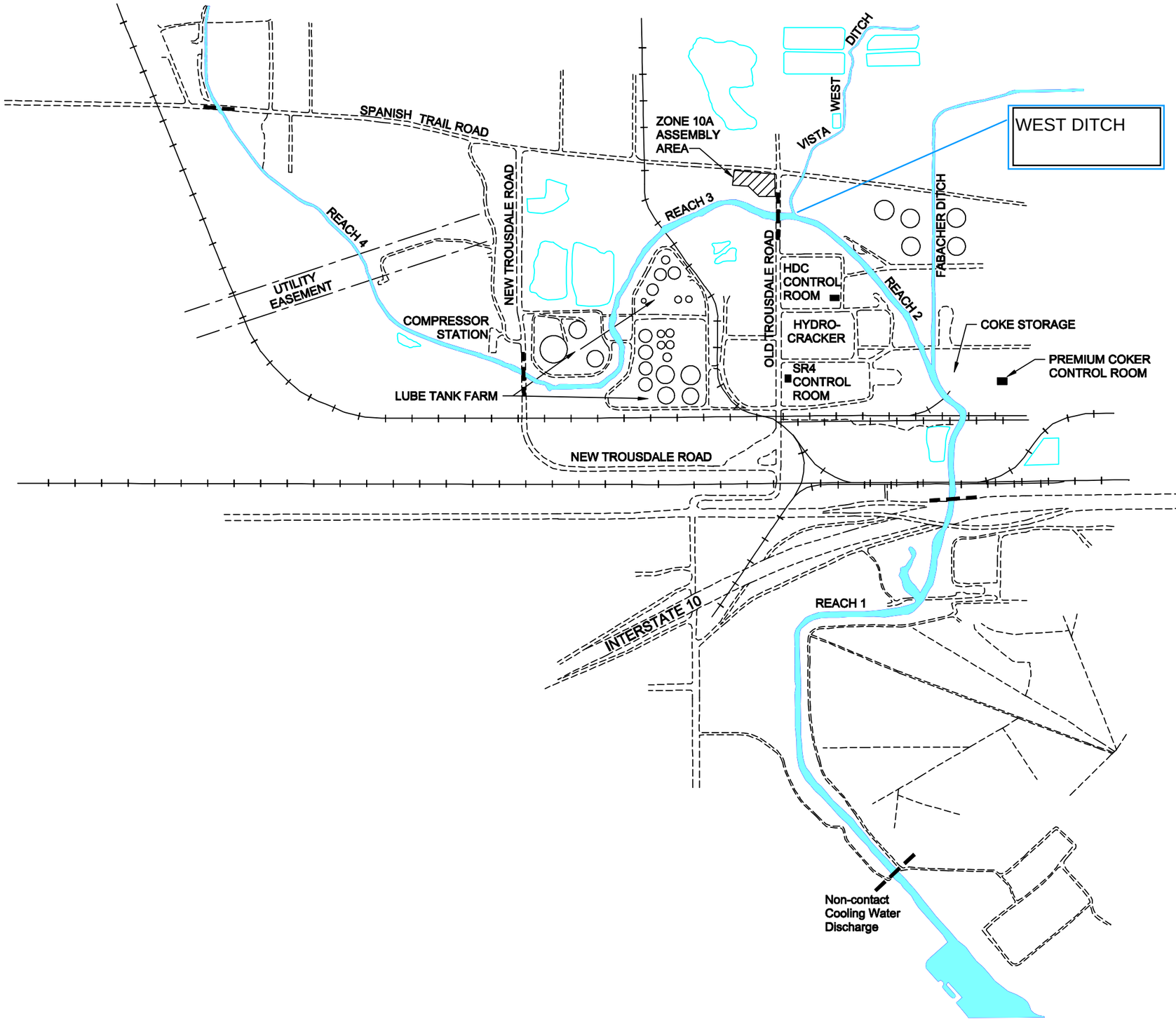
Conditions at the Site meet the criteria as defined by 40 CFR §300.415(b)(2) of the NCP for a removal, and I recommend your approval of the proposed removal action. The PRPs are expected to pay for this action, so no funds will be required from the Regional Allowance.

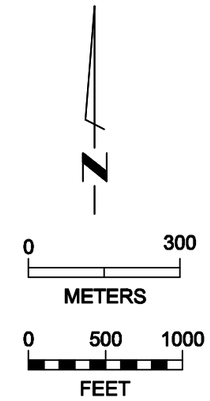
APPROVED Wren Stenger for Myron Knudson DATE 7/2/02

ATTACHMENT 1

Enforcement Addendum

Enforcement Sensitive -- FOIA Exempt – Not For Release





ATTACHMENT 2
BAYOU VERDINE AREA OF CONCERN

ATTACHMENT 3
SUMMARY OF COMPARATIVE ANALYSIS
WEST DITCH AREA

Criteria	Alternative WD-1 Natural Recovery	Alternative WD-2 Removal and Off-Site Incineration/ Disposal	Alternative WD-3 Removal and Onsite Thermal Desorption	Alternative WD-4 Containment/ Capping
Effectiveness (Each subcriterion has a possible 3 points for a total of 15 points for effectiveness)				
Overall Protection of Human Health and the Environment	0	3	3	2
Compliance With ARARs	3	3	3	3
Long-Term Effectiveness and Permanence	0	3	3	2
Reduction in Mobility, Toxicity or Volume	0	3	3	1
Short-Term Effectiveness	3	1	0	2
Implementability (Possible 5 points)	4	2	1	2
Cost (Possible 5 points)	4	1	1	3
Total	14	16	14	15